a temperature of the target process object is set to fall in a range of 400°C to 700°C when the metal oxide film is modified.

83. (New) The method of Claim 77, wherein the metal oxide film consists essentially of a material selected from a group consisting of:

tantalum oxide,

titanium oxide,

zirconium oxide,

barium oxide,

strontium oxide,

niobium oxide,

hafnium oxide,

yttrium oxide, and

lead oxide.

84. (New) The method of Claim 83, wherein the metal oxide film consists essentially of a material selected from a group consisting of:

tantalum oxide, and

hafnium oxide.

85. (New) The method of Claim 77, wherein:

the process gas contains at least one of oxygen, ozone, and N_2O.

REMARKS

Favorable reconsideration of the above-identified patent application in light of the foregoing amendment and the following remarks is respectfully requested.

REQUEST FOR CORRECTED OFFICIAL FILING RECEIPT. Applicants request that a *corrected* Official Filing Receipt (OFR) be prepared and mailed, an OFR reflecting Applicants' claim to priority to the parent patent application.

STATUS OF CASE. Claims 57-85 are active in the application, with Claims 1-56 being canceled without prejudice or disclaimer, either previously or by the present amendment.

THE APRIL 26, 2002 OFFICE ACTION. In the Office Action dated April 26, 2002, the restriction requirement was presented in writing with an indication that Claims 42-29 were withdrawn from consideration; Claims 50-56 were rejected under 35 U.S.C. §§ 102, 103.

RESPONSE TO OFFICE ACTION. All previously pending claims are canceled without prejudice or disclaimer, and Claims 57-85 are added. Non-limiting support for the newly-presented claims may be found as follows:

- Supply of N_2 gas or N_2 gas + H_2 gas into ail ozone generator (Claims 57, 62, ...): see, e.g., page 38, lines 15-19; page 63, lines 10-14.
- Use of an excimer lamp (Claims 60, 61, ...): see, e.g., page 50, lines 10-14; page 44, lines 18-24.
- Pressures of 0.1 Torr and 50 Torr (Claims 63, 65, ...): see, e.g., FIG. 23 and corresponding descriptions in the specification.
- A temperature of from 400°C (Claims 66 ...): see, e.g., page 67, lines 14-19; page 68, lines 22-24.
- The material group of a metal oxide film, further including niobium oxide, hafnium oxide, yttrium oxide, and lead oxide (Claims 67 ...): see, e.g., page 69, lines 19-22.

Applicants have canceled rejected Claims 50-56, technically rendering the rejections moot. However, Applicants submit that newly-presented Claims 57-85 are allowable, and provide the

following comments with the proviso that the language of the claims and not the following comments should determine the scope of coverage of the claims.

Independent Claims 57 and 69 recite that a small quantity of N_2 gas is fed into an ozone generator to increase generation efficiency of ozone when a process gas containing ozone is generated in the ozone generator. This feature clarifies the subject matter of now-canceled Claim 53. In this recitation, a small quantity of N_2 gas can be interpreted as meaning about 1 vol.% with respect to the oxygen gas, as described on page 63, lines 10-14.

Applicants submit that this feature is not suggested by the cited references, including JP 02-283,022. In relation to the subject matter of claim 53, the Office Action states that N_2 is commonly employed as carrier or diluent gas. However, according to the present invention, the action and effect of a small quantity of N_2 gas fed into an ozone generator completely differ from those of carrier gas or diluent gas. Furthermore, the technical term "carrier gas" or "diluent gas" connotes that the gas is used at a large ratio relative to the main gas. In contrast, a small quantity of N_2 gas is used according to the present invention.

Independent Claim 77 recites that an excimer lamp is used as a source of UV rays for exciting a process gas. Exciting the process gas by UV rays from the excimer lamp can increase generation efficiency of active oxygen atoms. This feature is not believed to be suggested by the cited references. ? Soga et al ?

The Fujita *et al.* and Sekiguchi *et al.* references relate to a superconductor, and the Sofia *et al.* reference relates to a recording medium. These references disclose techniques in a nonanalogous field and not to a modifying process of an insulating metal oxide film. Accordingly, it is not appropriate to cite these references.

Accordingly, allowance of the newly-presented claims is requested, taking into consideration the foregoing comments without limiting the scope of the claims.

In view of the present amendment and in light of the foregoing discussion, it is respectfully submitted that the pending claims are allowable and that the case is in condition for allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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ATTACHMENT

SHOWING CHANGES TO APPLICATION

Claims 1-56. (Canceled)

57. (New) A method of modifying a metal oxide film formed on a surface of a target process object, the method comprising:

loading the target process object including the metal oxide film formed thereon into a process vessel;

feeding oxygen gas and a small quantity of N_2 gas for increasing generation efficiency of ozone into an ozone generator connected to the process vessel, and generating a process gas containing ozone in the ozone generator;

supplying the process gas from the ozone generator into the process vessel;

exciting the process gas by a gas exciting system provided on the process vessel, thereby generating active oxygen atoms from the process gas; and

exposing the metal oxide film to the active oxygen atoms to modify the metal oxide film.

58. (New) The method of Claim 57, wherein the gas exciting system comprises a system selected from a group consisting of:

a heating system,

a plasma generating system, and

59. (New) The method of Claim 58, wherein the plasma generating system uses power selected from a group consisting of:

microwave power, and

high-frequency power.

60. (New) The method of Claim 58, wherein the UV radiating system comprises a lamp selected from a group consisting of:

a mercury-sealed lamp, and

an excimer lamp.

61. (New) The method of Claim 57, wherein:

the excimer lamp is set to emit UV rays having a wavelength of 180 nm or less.

62. (New) The method of Claim 57, wherein:

a small quantity of H_2 gas is fed along with the N_2 gas into the ozone generator when the process gas is generated.

63. (New) The method of Claim 57, wherein:

a pressure in the process vessel is set to fall in a range of 0.1 to 600 Torr when the metal oxide film is modified.

64. (New) The method of Claim 57, wherein:

a temperature of the target process object is set to fall in a range of 320°C to 700°C when the metal oxide film is modified.

65. (New) The method of Claim 57, wherein:

a pressure in the process vessel is set to fall in a range of 0.1 to 50 Torr when the metal oxide film is modified.

66. (New) The method of Claim 65, wherein:

a temperature of the target process object is set to fall in a range of 400°C to 700°C when the metal oxide film is modified.

67. (New) The method of Claim 57, wherein the metal oxide film consists essentially of a material selected from a group consisting of:

tantalum oxide,

titanium oxide,

zirconium oxide,

barium oxide,

strontium oxide,

niobium oxide,

hafnium oxide,

yttrium oxide, and

lead oxide.

68. (New) The method of Claim 67, wherein the metal oxide film consists essentially of a material selected from a group consisting of:

tantalum oxide, and

hafnium oxide.

69. (New) A method of modifying a metal oxide film formed on a surface of a target process object, the method comprising:

loading the target process object including the metal oxide film formed thereon into a process vessel;

feeding oxygen gas and a small quantity of N_2 gas for increasing generation efficiency of ozone into an ozone generator connected to the process vessel, and generating a process gas containing ozone in the ozone generator;

supplying the process gas from the ozone generator into the process vessel;

exciting the process gas, thereby generating active oxygen atoms from the process gas, while heating an interior of the process vessel by a heater through a worktable on which the target process object is placed; and

exposing the metal oxide film to the active oxygen atoms to modify the metal oxide film.

70. (New) The method of Claim 69, wherein a small quantity of H_2 gas is fed along with the N_2 gas into the ozone generator when the process gas is generated.

71. (New) The method of Claim 69, wherein:

a pressure in the process vessel is set to fall in a range of 0.1 to 600 Torr when the metal oxide film is modified.

72. (New) The method of Claim 69, wherein:

a temperature of the target process object is set to fall in a range of 320°C to 700°C when the metal oxide film is modified.

73. (New) The method of Claim 69, wherein:

a pressure in the process vessel is set to fall in a range of 0.1 to 50 Torr when the metal oxide film is modified.

74. (New) A method according to claim 73, wherein:

a temperature of the target process object is set to fall in a range of 400°C to 700°C when the metal oxide film is modified.

75. (New) The method of Claim 69, wherein the metal oxide film consists essentially of a material selected from a group consisting of:

tantalum oxide,

titanium oxide,

zirconium oxide,

barium oxide,

strontium oxide,

niobium oxide,

hafnium oxide,

yttrium oxide, and

lead oxide.

76. (New) The method of Claim 75, wherein the metal oxide film consists essentially of a material selected from a group consisting of:

tantalum oxide, and

hafnium oxide.

77. (New) A method of modifying a metal oxide film formed on a surface of a target process object, the method comprising:

loading the target process object including the metal oxide film formed thereon into a process vessel;

supplying the process gas containing oxygen atoms into the process vessel;

exciting the process gas by irradiating the process gas with UV rays emitted from an excimer lamp provided on the process vessel, thereby generating active oxygen atoms from the process gas; and

exposing the metal oxide film to the active oxygen atoms to modify the metal oxide film.

78. (New) The method of Claim 77, wherein:

the excimer lamp is set to emit UV rays having a wavelength of 180 nm or less.

79. (New) The method of Claim 77, wherein:

a pressure in the process vessel is set to fall in a range of 0.1 to 600 Torr when the metal oxide film is modified.

80. (New) The method of Claim 77, wherein:

a temperature of the target process object is set to fall in a range of 320°C to 700°C when the metal oxide film is modified.

81. (New) The method of Claim 77, wherein:

a pressure in the process vessel is set to fall in a range of 0.1 to 50 Torr when the metal oxide film is modified.

82. (New) The method of Claim 81, wherein:

a temperature of the target process object is set to fall in a range of 400°C to 700°C when the metal oxide film is modified.

83. (New) The method of Claim 77, wherein the metal oxide film consists essentially of a material selected from a group consisting of:

tantalum oxide,

titanium oxide,

zirconium oxide,

barium oxide,

strontium oxide,

niobium oxide,

hafnium oxide,

yttrium oxide, and

lead oxide.

84. (New) The method of Claim 83, wherein the metal oxide film consists essentially of a material selected from a group consisting of:

tantalum oxide, and

hafnium oxide.

85. (New) The method of Claim 77, wherein:

the process gas contains at least one of oxygen, ozone, and N_2O.